

WHAT IS CLAIMED IS:

1 1. In a data storage network, a method of maintaining data coherency
2 using two or more array management functions (AMFs) that are able to concurrently
3 access a redundancy group, the redundancy group including a plurality of resources, the
4 method comprising:

5 receiving a request from a host, by a first one of the AMFs, to perform a
6 first operation on data stored on a first one of the resources;

7 broadcasting a message from the first AMF to the other AMFs sharing
8 access to the first resource so as to acquire access to the first resource; and

9 performing the first operation on the data by the first AMF.

1 2. The method of claim 1, wherein the first operation is a write
2 operation, the method further comprising receiving from the host the data to be written to
3 the first resource by the first AMF.

1 3. The method of claim 2, wherein the broadcast message is a write
2 invalidate request, and wherein, responsive to the invalidate request, each of the AMFs
3 sharing access to the resource invalidates corresponding data stored in its cache.

1 4. The method of claim 2, further comprising sending replication and
2 state data from the first AMF to one or more other AMFs concurrently with performing
3 the write operation.

1 5. The method of claim 1, wherein the first operation is a read
2 operation.

1 6. The method of claim 5, further comprising performing a search of
2 the cache of each of the AMFs sharing access to the first resource for a copy of the data
3 requested in the read request.

1 7. The method of claim 6, further comprising reading the requested
2 data from the first resource if none of the AMFs sharing access respond with a copy of
3 the requested data.

1 8. The method of claim 6, further comprising receiving the requested
2 data from one of the AMFs sharing access to the resource.

1 9. The method of claim 5, wherein the broadcast message identifies
2 the data in the request, the method further comprising searching the cache of each of the
3 AMFs sharing access to the first resource for the identified data, and forwarding the
4 identified data to the first AMF if found in the cache.

1 10. The method of claim 1, further comprising determining whether
2 the data identified in the request is shared by one or more other AMFs.

1 11. In a data storage network, a method of maintaining data coherency
2 using two or more array management functions (AMFs) that are able to concurrently
3 access a redundancy group, the redundancy group including a plurality of resources, the
4 method comprising:

5 receiving a request from a host, by a first one of the AMFs, to perform a
6 first operation on data stored on a first one of the resources;

7 determining from the request whether the identified data is shared by one
8 or more of the other AMFs; and

9 if so:

10 broadcasting a message from the first AMF to the other AMFs sharing
11 access to the first resource so as to acquire access to the first
12 resource; and

13 performing the first operation on the data by the first AMF; and

14 if not:

15 performing the first operation on the data by the first AMF.

1 12. The method of claim 11, wherein the request is one of a write data
2 request and a read data request.

1 13. The method of claim 11, further comprising sending replication
2 and state data from the first AMF to one or more other AMFs concurrently with
3 performing the first operation.

1 14. The method of claim 11, wherein the broadcast message is a write
2 invalidate request, and wherein, responsive to the invalidate request, each of the AMFs
3 sharing access to the resource invalidates corresponding data stored in its cache.

1 15. A data storage network, comprising:
2 two or more controllers communicably coupled to a redundancy group,
3 each controller having one or more array management functions (AMFs), wherein two or
4 more of said AMFs are able to concurrently access the redundancy group, the redundancy
5 group including a plurality of resources, each controller further including:
6 means for receiving a request from a host to perform an operation on data
7 stored on a first one of the resources by a first AMF;
8 means for broadcasting a message from the first AMF to other AMFs
9 sharing access to the first resource so as to acquire access to the first resource; and
10 means for performing the first operation on the data by the first AMF.

1 16. A data storage network, comprising:
2 two or more controllers communicably coupled to a redundancy group,
3 each controller having one or more array management functions (AMFs), wherein two or
4 more of said AMFs are able to concurrently access the redundancy group, the redundancy
5 group including a plurality of resources, each controller further including:
6 means for receiving a request from a host to perform a first operation on
7 data stored on a first one of the resources by a first AMF;
8 means for determining from the request whether the identified data is
9 shared by one or more of the other AMFs;
10 means for broadcasting a message from the first AMF to the other AMFs
11 sharing access to the first resource so as to acquire access to the first resource if the data
12 is shared; and
13 means for performing the first operation on the data by the first AMF.